Forest Health Protection
Pacific Southwest Region

Date:

To: Jeff Linsey, Forest Manager, Hoopa Valley Tribal Forestry

Subject: Site visit post-fire salvage

At the request of Jeff Lindsey, a site visit was made to the Hoopa Valley Tribal Forest, on May 15, 2019. The objectives were to assess the current insect conditions and provide the results to the Tribal Council.

Background

From the Hoopa Tribal forestry website (accessed May 16, 2019) "The reservation was created through an agreement between the Hoopa Tribe and the United States Federal Government in 1876. The Reservation, described as an area 6 miles on either side of the Trinity River from the mouth of the Klamath River to the point where the river enters the Hoopa Valley, 12 miles from the confluence, creating a 12 mile square." The Hoopa Valley Tribal Reservation contains approximately 87,500 acres of commercial timberland with about 1.3 billion feet of commercially important timber species, primarily Douglas-fir. The Hoopa Tribes Forest Management Plan (FPM) includes commercial timber production and responsible management strategy focused on sustainability and multiple resource uses including traditional hunting/gathering. Under the Hoopa Tribes FMP Tribal Forestry manages approximately 400 acres of mature timber a year and has begun entering second growth stands in their timber sales.

The current site visit was due to increased insect activity following the Mill Creek 1 Fire, started August 16, 2018, which burned 3,674 acres north of the town of Hoopa. The Tribal Forestry is currently conducting a fire salvage and fuels reduction. The logging crews reported an abundance of beetle activity and were concerned for the viability of the timer product.

Observations

The first stop visited was on the northwest side of the valley. The fire had burned into mature Douglas-fir/oak forest. I did not find evidence of extensive beetle activity, however, I did find a single Douglas-fir log (>40 inch diameter), recently cut, that had what appeared to be Douglas-fir beetle attacks, evidenced by large piles of frass. Cutting into the cambium I was unable to locate beetles or galleries though. There were no other logs or standing trees with frass. No emergence holes were seen.

The second and third stops were on the north east side of the valley where more active fire salvage was occurring in smaller diameter Douglas-fir. Here the standing trees and log decks were starting to get attacked by flat headed fir borer. I was able to remove bark and pull larvae and show the galleries to the foresters. No emergence holes were seen.

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Discussion

Flatheaded fir borer, *Phaenops drummondi*, (previously in genus *Melanophila*) is a type of Buprestid wood boring beetle that behaves like a bark beetle. It feeds entirely underneath the bark instead of excavating galleries in the wood. Wood boring beetles found in western conifers aid in wood decomposition and tend to be secondary, in that they don't kill trees on their own but instead infest dead or dying trees. Flatheaded fir borer, however, can act like a primary insect pest by killing healthy looking trees, particularly Douglas-fir growing at ≤3,500' in elevation and/or on harsh, dry sites - during droughts. Mostly it attacks injured, mistletoe-infected, fire-injured, and dying trees.

The life cycle of the flatheaded fir borer normally lasts for one year but can be longer, depending on the quality of host as a food source. Adults emerge in the spring (March - April) and feed on conifer needles before flying to a suitable host tree. The adults are bronzy black with three small yellow spots on each wing cover. Eggs are laid in bark crevices and upon hatching, larvae immediately bore into the inner bark. Larvae feed mostly on cambium and some phloem without entering the sapwood, forming galleries packed with frass in a characteristic pattern. Late in the summer or early fall (August - September), larvae move to the outer bark where they construct pupal cells and overwinter. Adult beetles emerge the following spring.

Trees infested are usually pole size or larger. Attacks may be confined to the upper crown or large branches, resulting in top-kill and branch flagging. Trees can defend themselves from infestation by 'drowning' insects in resin, but if unsuccessful the tree will die, often lack of moisture reduces resin production. In the case of the stands affected by the Mill Creek 1 Fire, the fire burned through late August and September last year, long after beetle flight but providing an abundance of suitable host material and increased likelihood of trees that were fire-injured or killed to be infested this year.

Prompt fire salvage can be key to getting timber to market before degrade occurs. Oregon recommends that Douglas-fir with more than 50% of the crown or 25% of the cambium damaged by fire have an increased probability of attack and should be removed to prevent a build-up of borer populations. Flatheaded fir borer populations are naturally regulated by parasitic wasps and predators or by drowning in sap flows when there is adequate moisture in green trees. When larvae move toward the outer bark nearer to the surface to pupate, they are more exposed to parasitic wasps that fly in late summer or early spring and are also more accessible for woodpeckers.

It was recommended that salvage be continued to reduce the suitable host for this beetle.

Douglas-fir beetle, *Dendroctonus pseudotsugae*, is the most destructive bark beetle of Douglas-fir in the northern and central Rocky Mountains and across western Oregon and Washington. However, in California it appears to become epidemic only rarely and in very specific conditions. Attributes of stands typically under attack include:

- Mixed conifer stands with a high proportion of Douglas-fir
- High stand densities (240-360 sq ft basal area)
- Majority of stocking in medium- and large-diameter trees (10-40" dbh)

- Douglas-firs more than 150 years old

Normally it breeds in felled, injured, or diseased trees. The resulting endemic mortality is widely scattered. The stand we visited fit all of the criteria and was currently being harvested. The suspected infestation of a single log does not spell doom and gloom for the forest as resistance of the host trees in the coastal region keeps the Douglas-fir beetle under control most of the time. Even when outbreaks occur, following stand disturbances, such as fire, they abruptly subside because the beetles do not thrive in healthy green trees. In interior forests are subjected to greater stress and the effectiveness of natural control varies more than in coastal forests. In coastal forests, prompt salvage of beetle-killed, wind-thrown, and fire-killed trees is the recommended course of action.

Douglas-fir beetle has one generation each year. Overwintering takes place beneath the bark of the tree in which they developed and occurs mainly as adults. A small percentage may overwinter as larvae. Spring emergence of adult beetles usually occurs from mid-April to early June. Beetles that have passed the winter as larvae complete their development in spring and early summer. Those emerge and attack host trees in mid-summer. Broods require one year to complete their development-beetles emerging in spring are from the previous spring's brood and beetles flying later in the summer are typically from summer broods.

It was recommended that harvest continue, removing cut logs as soon as possible, and that FHP would be notified if green trees started to fade or show evidence of frass on the stem.

If you have any questions regarding this report and/or need additional information, please contact Cynthia Snyder at 530-226-2437.

/s/ Cynthia Snyder

CC: Chris Losi, Sheri Smith, Phil Cannon, Sherry Hazlehurst, Chris Fischer